which are not usually covered by federal grants, she says. Some SPA members have also supported the construction and operation of even larger projects involving science instruments. For example, the Sloan Digital Sky Survey, which includes a telescope and several spectrographs that have produced a detailed map of the universe to date, was launched with significant backing from the Sloan Foundation.

Wealth attracts wealth

Relying on charity for research funding comes with its own risks. A large portion of a foundation's income is based on how its endowment performs in the stock market. Also, who and what philanthropists choose to fund is often based on their personal associations and passions. For example, Stony Brook's Discovery Fund received a $500 000 seed donation from the Stony Brook Foundation, whose chairman emeritus is hedge-fund billionaire James Simons, former chair of the university's mathematics department and cofounder of the Simons Foundation.

In an opinion article for the July 2014 issue of *Chronicle of Philanthropy*, Pablo Einsenberg, a senior fellow at the Georgetown University Center for Public and Nonprofit Leadership, argues that foundations and philanthropists exacerbate wealth inequality in the US. "Just look at the giving patterns of most of the people who have signed the Giving Pledge, the effort by Bill and Melinda Gates and Warren Buffett to encourage their fellow billionaires to give at least half their fortunes away," he writes. "It's the same causes—colleges, hospitals, and other elite institutions—that keep getting money from the richest Americans."

Wealthy philanthropists also tend to favor biomedical research. SPA's members are among the few foundations that target physical sciences research; the exception is HHMI, which last year doled out more than $700 million to biomedical projects. For example, of the Kavli Foundation's 17 endowed institutes, 13 conduct research in cosmology, astrophysics, theoretical physics, and nanoscience. Particularly in those areas of physical sciences research, SPA can be "a resource and a voice to new philanthropy," says Conn.

"People get excited about cosmology and astronomy," says Kastner. But researchers pursuing some other fundamental physics topics "will have to make their case," he adds. "You can't just tell philanthropists how to spend their money."

Jermey N. A. Matthews

Momentum grows for new climate agreement

Pledged US greenhouse gas cuts should need no new authorizations from Congress, officials say.

Now that the US and Russia have pledged sizable reductions in their greenhouse gas emissions over the next 10–15 years, industrialized countries that spew 80% of the world's pollutants have announced their commitments in advance of a new global agreement to slow climate change.

In its submission to the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) on 31 March, the Obama administration pledged to reduce US emissions of carbon dioxide and other greenhouse gases by 26–28% from 2005 levels by 2025. The next day, Russia promised to lower its emissions by 25–30% from 1990 levels by 2030. The UNFCCC is the parent treaty to the 1997 Kyoto Protocol and has 196 member states.

Neither China, the world's largest greenhouse gas emitter, nor India, the third largest after the US, had submitted their pledges—so-called intended nationally determined contributions (INDCs)—by press time. But during President Obama's November 2014 visit to Beijing, Chinese president Xi Jinping committed to begin curtailing that nation's steadily increasing emissions in 2030.

The European Union's 28 member nations have agreed to a binding reduction of 40% from 1990 levels by 2030. Mexico, Norway, Switzerland, and Gabon have also submitted INDCs. Industrialized countries that have yet to submit INDCs as of mid-April include Japan, Canada, Australia, and New Zealand.

The INDCs are a prelude to new climate change negotiations that are expected to wrap up in Paris in December. The goal of the Paris talks is to reduce the buildup of greenhouse gases sufficiently to prevent world temperatures from rising more than 2 °C from their pre-industrial levels. The initial INDCs

J. A. DONNAN, GLACIER NATIONAL PARK ARCHIVES

KEVIN JACKS, US GEOLOGICAL SURVEY

The retreat of the Grinnell glacier in Montana's Glacier National Park is captured in these photographs taken in 1941 and 2013. According to some models, all of the park's glaciers may disappear by 2030.

"will clearly not add up to the emissions reductions needed" to meet that goal, said Christiana Figueres, executive secretary of the UNFCCC, "which is one reason why the Paris agreement must factor in a long-term emission trajectory based on science." The new accord, to succeed the Kyoto pact, would take effect in 2020.

The path to steep cuts

"Our submission is ambitious and achievable within existing legal authority," Brian Deese, Obama's senior adviser on climate change, told reporters. The necessary regulations are already in place or will be by the time Obama leaves office, Deese said. Significantly tightened vehicle fuel economy standards by 2022 have already been passed. And an Environmental Protection Agency proposal known as the clean power plan, to become final this summer, mandates 30% cuts in carbon dioxide emissions from US power plants.

Still to come are regulations that will cut by nearly half the methane leakage from natural gas operations and landfills, and an international agreement on phasing out hydrofluorocarbons is in negotiation, Deese said. Both compounds are far more potent greenhouse gases than CO_2.

The pledge "puts the US economy on track to reach deep reductions in greenhouse gas emissions, on the order of 80% by 2050," he said, adding that post-2025 reductions would come from unspecified future technological advances and innovations.

Praise and scorn

Environmental groups welcomed the US pledge. "America's leadership . . . already is delivering notable breakthroughs, such as the recent commitments by China and Mexico to join the global effort. And that bodes well for . . . the Paris conference in December," said Rhea Suh, president of the Natural Resources Defense Council.

"This is a serious and achievable commitment," said Jennifer Morgan, global director of the climate program at the World Resources Institute. "WRI research finds that under its existing federal authority, the United States can reach its proposed target."

But some congressional Republicans vowed to fight the administration plan. "Even if the job-killing and likely illegal clean power plan were fully implemented, the United States could not meet the targets laid out in this proposed new plan," Senate majority leader Mitch McConnell (R-KY) said. With 13 states having pledged to fight the plan, "our international partners should proceed with caution before entering into a binding, unattainable deal," he said.

"There is a reason the president chose to bypass Congress in order to negotiate a climate deal on his own. The president's plan gives control of US energy policy to unelected United Nations officials," said House Science, Space, and Technology Committee chairman Lamar Smith (R-TX). "This plan ignores good science and only seeks to advance a partisan political agenda."

Asked about congressional opposition, Todd Stern, US special envoy for climate negotiations, told reporters that "the kinds of regulations we're putting in place do not get easily undone."

David Kramer

US nuclear waste may have temporary home

Combined developments could break the logjam over disposition of spent nuclear fuel and defense high-level radioactive waste.

Not all nuclear waste is equal, according to the Obama administration's decision to split the disposal paths for highly radioactive waste from nuclear weapons production and the far bigger inventory of commercial spent fuel.

The decision approved by the White House should help accelerate the cleanup of defense waste, Energy Secretary Ernest Moniz announced on 24 March. The Department of Energy waste, stored at Cold War–era weapons production sites, is in various forms. Some could be disposed of more cheaply and expeditiously than via an as yet nonexistent geological repository. For example, Moniz noted that strontium